

Appln. No.: 10/663,534
Amendment Dated March 6, 2007
Reply to Office Action of December 08, 2006

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Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A data communication method for use in a wireless network having an access point, the method comprising the steps of:

determining a level for each of a plurality of wireless devices of the wireless network with respect to the access point;

determining for each of the plurality of wireless devices neighboring ones of the plurality of wireless devices having adjacent levels; and

processing a data message for transmission from one of the plurality of wireless devices to the access point, the one of the plurality of wireless devices populating an original source address and an immediate transmitter address of the data message with a source address corresponding to the one of the plurality of wireless devices and populating an immediate recipient address of the data message with an upstream neighbor address corresponding to an immediate upstream neighboring wireless device

~~transferring data messages between one of the plurality of wireless devices and the access point sequentially by level through at least one other one of the plurality of wireless devices.~~

2. (Currently Amended) The method of claim 1, wherein the level determining step comprises at least the steps of:

at each wireless device in the wireless network,

sending a broadcast message;

receiving broadcast messages from respective neighboring ones of the plurality of wireless devices, the broadcast messages indicating a neighbor level for each of the neighboring wireless devices; and

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determining the level for the wireless device responsive to the neighbor levels.

3. (Currently Amended) The method of claim 2, wherein the step of determining the level for the wireless device responsive to the neighbor levels comprises:

building a neighbor status database including the neighboring levels from the received broadcast messages;

identifying the neighboring level having a lowest initialized value; and

assigning, as the level of the wireless device, a level one greater than the neighboring level having the lowest initialized value.

4. (Currently Amended) The method of claim 3, further comprising the step of: ~~maintaining periodically updating the neighboring status database in a data-link layer.~~

5. (Original) The method of claim 1, further comprising the step of: updating the level for each of the plurality wireless devices at a predefined interval.

6. (Currently Amended) The method of claim 1, further comprising the step of transferring data messages between the one of the plurality of wireless devices and the access point sequentially by level through at least an other one of the plurality of wireless devices, wherein the transferring data messages step comprises at least the step of:

forwarding messages through ~~the at least one an~~ other one of the plurality of wireless devices ~~in a data-link layer.~~

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7. (Currently Amended) The method of claim 1, wherein ~~the data message includes a original source address, an immediate transmitter address, and an immediate recipient address, and wherein the transferring data messages step for communication from the one of the plurality of wireless devices to the access point comprises at least~~further comprising the steps of:

~~(a) processing the data message for transmission from the one of the plurality of wireless devices to the access point, the one of the plurality of wireless devices populating the original source address and the immediate transmitter address with a source address corresponding to the one of the plurality of wireless device and the immediate recipient address with an upstream neighbor address corresponding to an immediate upstream neighboring wireless device;~~

(ba) transmitting the data message to the immediate recipient address;

(eb) receiving the data message at the immediate upstream neighboring wireless device corresponding to the immediate recipient address;

(ec) storing the original source address and the immediate transmitter address of the data message in a down stream processing table associated with the immediate upstream neighboring wireless device; and

(ed) processing the data message for transmission to an other immediate upstream neighboring wireless device having a lower adjacent level than the immediate upstream neighboring wireless device, wherein the immediate transmitter address is updated to match the address of the immediate upstream neighboring wireless device and the immediate recipient address is updated to match the address of the other immediate upstream neighboring wireless device.

8. (Currently Amended) The method of claim 7, further comprising the steps of:

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repeating step (b)(a) through step (e)(d) until the data message reaches the access point.

9. (Currently Amended) The method of claim 7, further comprising the step of transferring data messages between the one of the plurality of wireless devices and the access point sequentially by level through at least an other one of the plurality of wireless devices, wherein the transferring data messages step for communication[[s]] from the access point to the one of the plurality of wireless devices comprises at least the steps of:

(fe) processing the data message for transmission from the access point to the one of the plurality of wireless devices, the access point populating thea final recipient address with a final destination address corresponding to the one of the plurality of wireless devices, wherein initially, the access point is an immediate downstream transmitter wireless device;

(gf) transmitting the data message from the immediate downstream transmitter wireless device;

(hg) receiving the data message at at least one immediate down stream neighboring wireless device(s)device, each immediate down stream neighboring wireless device having an associated down stream process table; and

(ih) processing the data message for transmission from the at least one immediate down stream neighboring wireless device(s)device if the final recipient address is located in the down stream processing table associated with the at least one immediate down stream neighboring wireless device(s)device, wherein the at least one immediate down stream neighboring wireless device(s)device becomes the immediate down stream transmitting-transmitter device.

10. (Currently Amended) The method of claim 9, wherein the transferring data messages step for communications-communication from the access point to the one of the plurality of wireless devices further comprises at least the step of:

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repeating step (fe) through step (ih) until the immediate down stream neighboring wireless device is the one of the plurality of wireless devices.

11-13. (Cancelled)

14. (Currently Amended) A wireless device for use in a wireless network including a plurality of wireless devices and an access point, the wireless devices capable of determining a level with respect to the access point, the wireless device comprising:

a transceiver that sends a broadcast message and receives broadcast messages from neighboring ones of the plurality of wireless devices, the broadcast messages indicating a neighbor level for each of the neighboring wireless devices; and

a controller coupled to the transceiver that generates the broadcast message and determines the level of the wireless device responsive to the neighbor levels; and

means for transferring data messages between one of the plurality of wireless devices and the access point sequentially by level through at least one other one of the plurality of wireless devices, including means for processing a data message for transmission from the one of the plurality of wireless devices to the access point, the one of the plurality of wireless devices populating an original source address and an immediate transmitter address with a source address corresponding to the one of the plurality of wireless devices and populating an immediate recipient address with an upstream neighbor address corresponding to an immediate upstream neighboring wireless device.

15. (Currently Amended) The wireless device of claim 14, wherein the controller determines the level of the wireless device by building a neighbor status database including the neighboring levels from the received broadcast messages, identifying the neighboring level having a lowest initialized value, and assigning, as the level of the wireless device, a level one greater than the neighboring level having the lowest initialized value.

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16. (Original) The wireless device of claim 14, further comprising:
a memory coupled to the controller that stores information relating to neighboring ones of the plurality of wireless devices in levels adjacent the determined level of the wireless device.

17. (Currently Amended) A data communication system for use in a wireless network having an access point, the system comprising:

means for determining a level for each of a plurality of wireless devices of the wireless network with respect to the access point;

means for determining, for each of the plurality of wireless devices, neighboring ones of the plurality of wireless devices having adjacent levels; and

means for transferring data messages between one of the plurality of wireless devices and the access point sequentially by level through at least one other one of the plurality of wireless devices, including means for processing a data message for transmission from the one of the plurality of wireless devices to the access point, the one of the plurality of wireless devices populating an original source address and an immediate transmitter address with a source address corresponding to the one of the plurality of wireless devices and for populating an immediate recipient address with an upstream neighbor address corresponding to an immediate upstream neighboring wireless device.

18. (Currently Amended) The system of claim 17, wherein the means for transferring data messages comprises:

means for forwarding messages through the least one other of the plurality of wireless devices ~~in a data link layer.~~

19. (Currently Amended) A physical computer readable carrier including software that is configured to control a general purpose computer to implement a method for use by a wireless device within a wireless network having an access point and a

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plurality of wireless devices to determine a level for the wireless device with respect to the access point, the method comprising the steps of:

sending a broadcast message;

receiving broadcast messages from neighboring ones of the plurality of wireless devices, the broadcast messages indicating a neighbor level for each of the neighboring wireless devices; and

determining the level for the wireless device responsive to the neighbor

levels; and

processing a data message for transmission from one of the plurality of wireless devices to the access point, the one of the plurality of wireless devices populating an original source address and an immediate transmitter address of the data message with a source address corresponding to the one of the plurality of wireless devices and populating an immediate recipient address of the data message with an upstream neighbor address corresponding to an immediate upstream neighboring wireless device.

20. (Currently Amended) The physical computer readable carrier of claim 19, wherein the software that is configured to control the general purpose computer to determine the level for the wireless device comprises software for:

building a neighbor status database including the neighboring levels from the received broadcast messages;

identifying the neighboring level having a lowest initialized value; and

assigning a level one greater than the neighboring level having the lowest initialized value.